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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,781	04/10/2006	Jacob Foldager	006029.00015	6872
22907 7590 11/26/2008 BANNER & WITCOFF, LTD. 1100 13th STREET, N.W. SUITE 1200 WASHINGTON, DC 20005-4051			EXAMINER HOLLOWAY, JASON R	
			ART UNIT 3633	PAPER NUMBER
			MAIL DATE 11/26/2008	DELIVERY MODE PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/560,781

**Applicant(s)**

FOLDAGER ET AL.

**Examiner**

JASON HOLLOWAY

**Art Unit**

3633

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 10 April 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 14 December 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
- Paper No(s)/Mail Date 14 December 2005
- 4) ☐ Interview Summary (PTO-413)
- Paper No(s)/Mail Date \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_

### **DETAILED ACTION**

This communication is a first Office Action Non-Final rejection on the merits.

Claims 1-20, as originally filed, are currently pending and have been considered below.

#### ***Drawings***

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the third layer of rods and their interaction with the first two layers of rods and the transverse runs of filament must be shown or the feature canceled from the claims. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Claim Rejections - 35 USC § 112***

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 1 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding claim 1, the recitation “the rods of the first and third layers being paired such that each nth rod of the first layer, herein designated rod  $n_1$ , is paired with the nth rod of the third layer, herein designated rod  $n_3$ ” is unclear because stating that two rods are a “pair” of rods when they are separated by a third rod between them confuses the scope of the claim. The pairing appears arbitrary since there does not seem to be a reason to call two seemingly independent rods a “pair.”

Claims 2-20 depend from rejected claim 1 and therefore carry the same deficiency. Accordingly, the claims will be examined “as best understood.”

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. As best understood, claims 1-3, 6, 8, 10-12, 15-17, 19 and 20 are rejected under 35 U.S.C. 102(b) as being anticipated by Bache (6,358,603).

**Regarding claim 1**, Bache teaches an assembly of interlaced rods (figure 1), suitable for use as embedded reinforcement in matrix materials, comprising first, second and third layers of rods (reinforcing bars 4, 5; as illustrated in figure 1, three layers of reinforcing bars are shown),

the rods (reinforcing bars 4, 5) of each layer being orientated generally parallel to one another (as illustrated in figure 1, the reinforcing bars are parallel to one another),

the second layer being located between the first and third layers (as illustrated in figure 1, the second (middle) layer is between the first and third layers),

the rods (reinforcing bars 4, 5) of the first and third layers being longitudinally orientated in the same direction, with those of the second layer being longitudinally orientated generally at right angles thereto (as illustrated in figure 1, the rods of the three layers are oriented in the same direction, each of which being at a right angle to one another),

the rods (reinforcing bars 4, 5) of the first and third layers being paired such that each nth rod of the first layer, herein designated rod  $n_1$ , is paired with the nth rod of the third layer, herein designated rod  $n_3$  (as illustrated in figure 1, reinforcing bars 4, 5 can be considered to be paired in the same manner as claimed).

paired rods (reinforcing bars 4, 5) of the first and third layers being drawn together under tension by a flexible filament (transverse reinforcing bars 6) wound between them in a series of runs spaced along the length of the rods (reinforcing bars 4,

5) of the first and third layers (as described in column 7 lines 59-65), each such run extending transversely to the longitudinal orientation of the rods (as illustrated in figure 1),

rods (bars 4, 5) of the second layer (middle layer of figure 1) being located generally parallel to and between adjacent transverse runs of filament (transverse reinforcing bars 6) (as illustrated in figure 1),

each such transverse run of filament (transverse bars 6) comprising a forward and reverse sinusoidal winding (although not illustrated, Bache teaches a reverse sinusoidal winding pattern can be included which would connect the bars in figure 1 which are not illustrated as being wound by the transverse reinforcing bar; described in column 7 line 66 to column 8 line 9) which interlaces rods (bars 4, 5) of the first and third layers (as illustrated in figure 1; described in column 7 lines 59-65 and column 7 line 66 to column 8 line 9),

the forward sinusoidal winding following the pattern: rod  $1_1 \dots 2_3 \dots 3_1 \dots 4_3 \dots$  and then continuing in the reverse sinusoidal winding pattern (although not illustrated, Bache teaches a reverse sinusoidal winding pattern can be included which would connect the bars in figure 1 which are not illustrated as being wound by the transverse reinforcing bar; described in column 7 line 66 to column 8 line 9) whereby each pair of rods  $n_1$  and  $n_3$  in the first and third layers is enclosed by and drawn together by a loop of filament (transverse rod 6) formed by the forward and reverse winding pattern (as illustrated in figure 1; described in column 7 lines 59-65 and column 7 line 66 to column 8 line 9).

**Regarding claim 2**, Bache teaches a single rod (reinforcing bars 4, 5) of the second layer (middle layer of figure 1) is located between any adjacent pair (although not illustrated, Bache teaches a reverse sinusoidal winding pattern can be included which would connect the bars in figure 1 which are not illustrated as being wound by the transverse reinforcing bar; described in column 7 line 66 to column 8 line 9) of transverse runs of filament (as illustrated in figure 1, a single rod is disposed between a pair of outer rods).

**Regarding claim 3**, Bache teaches more than one rod (4, 5) of the second layer (middle layer of figure 1) is located between at least one adjacent pair (although not illustrated, Bache teaches a reverse sinusoidal winding pattern can be included which would connect the bars in figure 1 which are not illustrated as being wound by the transverse reinforcing bar; described in column 7 line 66 to column 8 line 9) of transverse runs of filament (figure 1 shows multiple reinforcement bars 4 and 5 disposed between transverse reinforcing bar 6).

**Regarding claim 6**, Bache teaches the filament (transverse reinforcing bar 6) is in the form of a wire, a monofilament, or a multifilament string or rope (column 8 lines 41-47 teach the transverse reinforcing bar is a wire; figure 6).

**Regarding claim 8**, Bache teaches the rods (reinforcing bars 4, 5) are of steel or of fibre-filled resin (column 7 line 66 to column 8 line 1 teaches the reinforcing bars are made from steel).

**Regarding claim 10**, Bache teaches the rod assembly (via reinforcing bars 4, 5 of figure 1) is embedded in matrix material (abstract lines 1-5 teaches the rod assembly is embedded in a matrix).

**Regarding claim 11**, Bache teaches the matrix material is a synthetic polymer (abstract lines 15-17 teach the matrix material comprises microsilica which is a known in the art to be a synthetic polymer. Further, the matrix material of Bache comprises a superplasticizer which is also known in the art to be a polymer, i.e. the plasticizers polyether, vinyl chloride co-polymers and polycarboxylate).

**Regarding claim 12**, Bache teaches the matrix material has additional plate or rod (2) reinforcement embedded or partially therein in spaced or contiguous layered relationship to the rod assembly (Bache teaches additional rod reinforcement embedded in the matrix via spaced horizontal rods 2 illustrated in figure 1 and described in column 7 lines 55-59; column 4 lines 48-63 teaches a combination of bars and plates can be used for additional reinforcement, plates are illustrated in figure 9).

**Regarding claim 15**, Bache teaches the rod assembly is laminated as a backing to blast or ballistic impact-resistant armor (the rod assembly is a backing to a 20 cm thick panel or plate which serves as blast and ballistic resistant material; column 4 lines 11-22).

**Regarding claim 16**, Bache teaches the rod assembly is laminated as a backing to blast or ballistic impact-resistant armor (the rod assembly is a backing to a 20 cm thick panel or plate which serves as blast and ballistic resistant material; column 4 lines 11-22) comprising contiguous cells filled with matrix material (by definition, the spaces



in between the horizontal, vertical, and transverse rods are contiguous cells. These cells are filled with a matrix material; abstract lines 1-5 teaches the rod assembly is embedded in a matrix).

**Regarding claim 17**, Bache teaches the rod assembly is laminated to a backing mass which crushes or deforms progressively under impact (the deformation is illustrated in figure 14B), the rod assembly is laminated to a backing mass (as illustrated in figure 11, the deformation under impact and backing plates covering the matrix are described in column 4 lines 11-39).

**Regarding claim 19**, Bache teaches a rod assembly which is in the form of a shaped article (abstract line 1).

**Regarding claim 20**, Bache teaches a rod assembly which is in the form of a panel (as illustrated in figure 11, the rod assembly is in panel form).

***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. As best understood, claims 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bache (6,358,603).

**Regarding claim 4**, Bache teaches each transverse run (transverse reinforcing bar 6) is formed by one wound filament (figures 1, 6, 7, and 14 show the transverse reinforcing bar 6 as a single continuously wound piece; column 7 line 66 to column 8

line 9 teaches there can be a second transverse bar [not shown in the drawings] which interlocks the remaining reinforcing bars 4, 5 which are not interlocked by the first transverse bar 6).

However, Bache fails to explicitly disclose the transverse filaments (transverse bars 6) are formed as a single continuously wound piece.

It would have been obvious to one of ordinary skill in the art to integrate the two filaments into one piece since it has been held that making parts integral is a matter of obvious engineering design choice and does not constitute patentable subject matter if the claimed invention does not perform differently than the prior art device (In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965)). Further, it would have been obvious to make the filament a continually wound piece as opposed to two pieces in order to reduce labor time.

**Regarding claim 5**, Bache teaches all the transverse runs (transverse reinforcing bar 6) are formed by one wound filament (figures 1, 6, 7, and 14 show the transverse reinforcing bar 6 as a single continuously wound piece; column 7 line 66 to column 8 line 9 teaches there can be a second transverse bar [not shown in the drawings] which interlocks the remaining reinforcing bars 4, 5 which are not interlocked by the first transverse bar 6).

However, Bache fails to explicitly disclose the wound filaments are one and the same continuously wrapping the reinforcing bars 4, 5.

It would have been obvious to one of ordinary skill in the art to integrate the two filaments into one piece since it has been held that making parts integral is a matter of

obvious engineering design choice and does not constitute patentable subject matter if the claimed invention does not perform differently than the prior art device (In re Larson, 340 F.2d 965, 968, 144 USPQ 347, 349 (CCPA 1965)). Further, it would have been obvious to make the filament a continually wound piece as opposed to two pieces in order to reduce labor time.

8. As best understood, claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bache (6,358,603) in view of Messenger et al. (6,701,683).

**Regarding claim 7**, Bache teaches a filament (transverse rod 6) made of steel.

However, Bache fails to explicitly disclose a filament made of carbon fiber.

Messenger et al. teaches a composite concrete panel with a transversely oriented carbon fiber reinforcement (carbon fiber strands 10; column 4 lines 54-61).

Therefore, from the teaching of Messenger et al., It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the transverse reinforcement rod of Bache with the carbon fiber transverse reinforcement of Messenger et al. in order to provide a lighter structure while maintaining sufficient strength characteristics for the transverse reinforcement.

9. As best understood, claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bache (6,358,603) in view of (Barnett et al. (US 2002/0108338).

**Regarding claim 9**, Bache teaches steel reinforcing rods (4, 5) but fails to explicitly disclose the rods can be made of fiberglass.

Barnett et al. teaches a concrete panels (81) with fiberglass rod reinforcement (83; as illustrated in figure 4A).

Therefore, from the teaching of Barnett et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the steel reinforcement rods of Bache with the fiberglass reinforcement rods as taught by Barnett et al. in order to provide a lighter structure while maintaining sufficient strength characteristics of the reinforcement bars.

10. As best understood, claims 13 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bache (6,358,603) in view of Thomas (5,736,474).

**Regarding claim 13**, Bache teaches the matrix has transverse reinforcement rods embedded or partially embedded therein in spaced or contiguous layered relationship to the rod assembly (as illustrated in figure 1)

However, Bache fails to explicitly disclose a flexible sheet material is included in the matrix.

Thomas teaches a multi-structure ballistic material which is embedded with a flexible sheet material (composite layers 18 and 20).

Therefore, from the teaching of Thomas, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the matrix of Bache to include the flexible composite sheet layers of Thomas in order to provide further resistance to ballistic impacts.

**Regarding claim 14**, the combination of Bache and Thomas teaches the flexible sheet material is a woven mat of aramid fibre (column 3 lines 34-35 teaches the sheet material is Kevlar, which is known in the art as a woven aramid fiber).

Therefore, from the teaching of Thomas, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the matrix of Bache to include the woven Kevlar composite sheet layers of Thomas in order to provide further resistance to ballistic impacts.

11. As best understood, claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bache (6,358,603) in view of Cook et al. (4,179,979).

**Regarding claim 18**, Bache teaches the backing mass is made of cells formed between the horizontal, vertical, and transverse rods (by definition, the spaces in between the horizontal, vertical, and transverse rods are contiguous cells).

However, Bache fails to explicitly disclose a cellular or foamed material.

Cook et al. teaches a multi-layered ballistic armor system which comprises a foam backing layer (polyurethane foam 20; as illustrated in figure 1).

Therefore, from the teaching of Cook et al., it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the backing mass of Bache to include the polyurethane foam backing as disclosed in Cook et al. in order to provide an additional buffer between the steel armor plate and the rod assembly which would provide further resistance to ballistic impacts and the heat produced from such impacts.

### ***Conclusion***

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Bache (4,588,443) teaches a shaped article made of a composite matrix.

Bache (6,651,011) teaches a shaped composite matrix material reinforced with rods.

Bache (4,979,992) teaches a reinforced composite matrix reinforced with rods.

Cohen (6,289,781) teaches a composite armor plate with a cellular backing.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JASON HOLLOWAY whose telephone number is (571) 270-5786. The examiner can normally be reached on M-F 9:00-5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Brian Glessner can be reached on 571-272-6843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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